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FISH & RICHARDSON PC			ALEJANDRO, RAYMOND	
225 FRANKLIN ST			ART UNIT	
BOSTON, MA 02110			PAPER NUMBER	

1745

DATE MAILED: 05/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/034,901

Applicant(s)

CINTRA ET AL.

Examiner

Raymond Alejandro

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02/16/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-15 is/are pending in the application.
- 4a) Of the above claim(s) 5-8 and 12-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,9-11,14 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 02/16/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114.

Applicant's submission filed on 02/16/05 has been entered.

This office action is being provided in reply to the aforementioned RCE. Accordingly, the indicated allowability of claims 1 and 3-15 is withdrawn in view of the newly discovered reference as presented infra. Thus, prosecution on the merits of this application is continued on claims 1, 3-4, 9-11 and 14-15 considered unpatentable for the reasons indicated below:

### ***Election/Restrictions and Claims Disposition***

1. For purposes of prosecution, claims 5-8 and 12-13 have been re-withdrawn from consideration as they are directed to a non-elected invention. Refer to the response to restriction requirement of 08/20/03 for more details.
2. In addition, it is also noted that claims 16-45 has been cancelled. Refer to the amendment of 11/01/04 for more information.
3. Accordingly, claims 1, 3-4, 9-11 and 14-15 are being examined on their merits.

***Information Disclosure Statement***

4. The information disclosure statement (IDS) submitted on 02/16/05 was considered by the examiner.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 3-4, 9-11 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson 6402796 in view of Fukumura et al 5834052.

The instant application is directed to a method of making a battery electrode wherein the disclosed inventive concept comprises forming a cathode layer and removing the substrate. Other limitations include the cathode mixture; the substrate material; the current collector; the binder and the continuous process.

Art Unit: 1745

As to claim 1:

Johnson discloses a method of producing a battery wherein the method commences with a substrate 11 upon which the layers of battery components are built upon; the substrate is then remove and replaced with a cathode current collector (Abstract/Col 3, lines 24-45). Johnson teaches that a cathode made of a lithium intercalation compound or lithium metal oxide  $\text{LiM}_x\text{O}_y$  where M is a metal and O denotes oxygen such as  $\text{LiCoO}_2$ ,  $\text{LiMgO}_2$  or  $\text{LiNiO}_2$  or  $\text{LiFeO}_2$  (COL 2, lines 9-15). Thus, Johnson refers to mixed metal oxides which are compounds formally derived from an individual metal oxides but contain two or more metal species often in arbitrary ratio.

Johnson discloses and claims the following (COL 1, lines 43-47/ CLAIMS 1 and 8):

In a preferred form of the invention a method of producing a method of producing a thin film battery cell comprises the steps of providing a supporting substrate, depositing a cathode upon the substrate, depositing an electrolyte upon the cathode, and removing the substrate from the cathode.

- 10 1. A method of producing a portion of a thin film battery cell comprising the steps of:
- (a) providing a supporting substrate;
  - (b) depositing a cathode upon the substrate;
  - (c) depositing an electrolyte upon the cathode; and
  - 15 (d) removing the substrate from the cathode.

- 30 8. A method of producing a portion of a thin film battery cell comprising the steps of:
- (a) providing a substrate made of a sputterable material;
  - (b) depositing a cathode upon the substrate; and
  - 35 (c) sputtering the substrate so as to substantially remove the substrate from the cathode.

**Examiner's note:** *the instant claims fail to further specify whether the term "cathode mixture" stands for a physical mixture wherein the substances are mixed but not chemically combined and may be separated mechanically. Consequently, the present claim language has been construed as encompassing either: i) a physical mixture, or ii) a cathode mixture*

Art Unit: 1745

*comprising any mixed metal oxides representing compounds which are formally derived from individual slurry metal oxides but contain two or more metal species often in arbitrary ratio, are chemical reaction products generally formed by heating mixture of appropriate oxides and are not physical mixtures but are true examples of chemical mixtures i.e. chemical compounds of arbitrary ratio.*

As to claims 3-4:

Johnson disclose that the substrate can be either a metal or polymeric material (COL 3, lines 24-25/COL 5, lines 25-28):

compounds. It should also be understood that other materials<sup>25</sup> may be utilized for the web substrate such as nickel, copper, nickel-copper compounds, other metals and some polymers, such as polyethylene. Furthermore, it should also be under-

As to claims 9-10:

It is disclosed that as the web continues about the aligning drum 62 the web passes below the cathode current collector mask 68 and adjacent the cathode current collector sputtering device, so that the cathode current collector device 67 deposits a very thin cathode current collector 18 thereon (COL 4, lines 54-62). It is further discloses that the web may be wound upon the aligning drum 62 in such a manner so that complete battery cells are stacked in alignment one upon the other (COL 4, lines 63-67). *Thus, the layers are stacked one upon another, at least, under certain degree of pressure.*

As to claim 11:

It is disclosed that the a protective coating may then be deposited upon the current collector to allow later stacking of the battery (COL 4, lines 35-39). *Thus, the protective coating assists to bind together the stackable components.*

Art Unit: 1745

As to claims 14-15:

Johnson teaches that the process of depositing cathode materials continues until substantially the entire substrate web is coated (COL 3, lines 43-46). Johnson further discloses that the process is continuously carried out (COL 3, lines 46 to COL 4, lines 62). *Thus, the steps of forming the layer and removing the substrate are continuous.*

Johnson discloses a method of producing an electrode battery as discussed above. However, the preceding prior art fails to expressly teach the cathode mixture slurry.

Fukumura et al disclose a method for producing an electrode sheet having a multilayer structure (TITLE/ABSTRACT) wherein two or more layers for an electrode sheet are simultaneously coated with a coating solution (ABSTRACT). Particularly, Fukumura et al disclose using a slurry of a coating solution (COL 6, lines 39-41/ EXAMPLE 1/ COL 8, lines 38-40).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the cathode mixture slurry of Fukumura et al in the method of Johnson as Fukumura et al teach that such coating solution slurry also serves as a protective layer. Thus, the cathode material in the form of a slurry acts as a protective feature too. *In this case, it is noted that the two references (i.e. Fukumura et al and Johnson) are significantly relevant to each other as they both resolve the same problem of making/producing a layered electrode structure; and as such, they are also pertinent to field of applicant's endeavor regardless of the specific manufacturing technique.*

Art Unit: 1745

8. Claims 1, 3-4, 9-11 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukumura et al 5834052 in view. Johnson 6402796.

As to claim 1:

Fukumura et al disclose a method for producing an electrode sheet having a multilayer structure (TITLE/ABSTRACT) wherein two or more layers for an electrode sheet are simultaneously coated with a coating solution (ABSTRACT). Particularly, Fukumura et al disclose using a slurry of a coating solution (COL 6, lines 39-41/ EXAMPLE 1/ COL 8, lines 38-40). In the EXAMPLES of the POSITIVE ELECTRODE 1, it is shown the use a slurry of a coating solution for a positive electrode (COL 6, lines 33-65); and such a coating solution is to be coated on a base material sheet (*the substrate*) (COL 3, lines 25-33).

Concerning claims 3-4:

Fukumura et al disclose the use of base material sheets made of metals, non-conductive polymer film, and paper (COL 3, lines 55-67).

With reference to claims 9-10:

Fukumura et al disclose coating the coating solution on the base material (COL 3, lines 25-34) wherein the base material is a current collector (COL 3, lines 55-60). *Thus, Fukumura et al envisions contacting the cathode material layer with a current collector. Moreover, absent further specific pressure magnitude, it is thus contended that such current collector coating is carried out under certain pressure.*

Regarding claim 11:

Fukumura et al disclose the use of a coating layer containing carbon on the polymer film, and/or a paper to provide an electric conductive property (COL 3, line 64 to COL 4, line 5).

Art Unit: 1745

*Thus, Fukumura et al at once envisage using additional constituents for electrically conducting purposes.*

On the matter of claims 14-15:

Fukumura et al reveals that their method for producing the electrode having a multilayer structure is carried out continuously (COL 3, lines 5-13).

Fukumura et al disclose the method for producing the electrode as discussed above. However, the preceding prior art does not expressly disclose the specific substrate removing step.

Johnson discloses a method of producing a battery wherein the method commences with a substrate 11 upon which the layers of battery components are built upon; the substrate is then removed and replaced with a cathode current collector (Abstract/Col 3, lines 24-45). Johnson discloses and claims the following (COL 1, lines 43-47/ CLAIMS 1 and 8):

In a preferred form of the invention a method of producing a method of producing a thin film battery cell comprises the steps of providing a supporting substrate, depositing a cathode upon the substrate, depositing an electrolyte upon the cathode, and removing the substrate from the cathode.

10 1. A method of producing a portion of a thin film battery cell comprising the steps of:  
15 (a) providing a supporting substrate;  
(b) depositing a cathode upon the substrate;  
(c) depositing an electrolyte upon the cathode; and  
(d) removing the substrate from the cathode.

30 8. A method of producing a portion of a thin film battery cell comprising the steps of:  
(a) providing a substrate made of a sputterable material;  
(b) depositing a cathode upon the substrate; and  
32 (c) sputtering the substrate so as to substantially remove the substrate from the cathode.

In light of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to perform the specific substrate removing step of Johnson in the

Art Unit: 1745

method of Fukumura et al as Johnson teaches that such substrate removing step allows to make batteries with a greater volume of active material and minimal volume of inactive material in order to achieve a high volumetric power density. Accordingly, the substrate which contains inactive material itself and support other batteries component during manufacturing process can be constructively removed to increase utilization of active material, thereby volumetric power density is greatly increased due to the mere removal of the substrate. *In this case, it is noted that the two references (i.e. Fukumura et al and Johnson) are significantly relevant to each other as they both resolve the same problem of making/producing a layered electrode structure; and as such, they are also pertinent to field of applicant's endeavor regardless of the specific manufacturing technique.*

#### ***Allowable Subject Matter***

9. The indicated allowability of claims 1 and 3-15 is withdrawn in view of the newly discovered reference(s). Rejections based on the newly cited reference have been set forth supra.

#### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro  
Primary Examiner  
Art Unit 1745



RAYMOND ALEJANDRO  
PRIMARY EXAMINER